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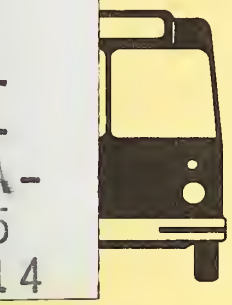
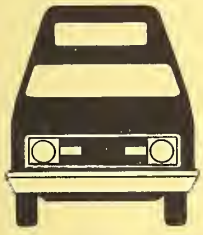


Small City Transit

XENIA, OHIO:

Transit Service For a Rebuilding Community



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U. S. DEPARTMENT OF TRANSPORTATION
Urban Mass Transportation Administration
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Preface

This document was prepared by the Transportation Systems Center (TSC) as part of the information dissemination function of the Office of Service and Methods Demonstrations, Urban Mass Transportation Administration. This case study is one of thirteen studies of public transit systems in small communities and is intended to serve as an information resource for other communities in the process of planning or considering public transportation.

The information presented in this document is based on a visit to the site, interviews and phone conversations with the principals involved, and operating records obtained during 1975. The authors gratefully acknowledge the cooperation of local officials and transit operators at all of the sites selected for study, and of the TSC staff in compiling the information gained from these studies and assisting in its interpretation.

XENIA, OHIO: A Transit Service For A Rebuilding City

The tornado which struck the city of Xenia on April 3, 1974, left a significant portion of the residents without automotive transportation. Transit service was introduced to assist in the community redevelopment. Through a series of Federal grants, the transit service has evolved from free emergency services to a demonstration of para-transit services. The latest grant will test the operational feasibility of serving a community of over 25,000 people with a combination of para-transit services and will permit a cost-effectiveness comparison with the fixed route service recently terminated.

Background

Xenia, Ohio, is a small satellite community located approximately 13 miles beyond the eastern fringe of the City of Dayton, Ohio, but within the Dayton urbanized area. This small midwestern community had a 1970 census population of 25,373. City survey data in 1974 estimated only slight population growth since 1970 and a residential density of about 3,100 persons per square mile. In 1970 the median household income was $10,200. At that time, there was an average auto-ownership level of 0.8 cars per household with 11% of the households not having a car, and 48% of the households having only one car. Persons 60 or more years old made up 10.5% of the population, while 42% of the population was under 19 years of age.

Although Xenia had been served by a bus line between downtown Xenia and downtown Dayton, the problem of intra-city travel was left to the individual, the automobile, and a small taxi company (89% of all work trips were made as auto driver or passenger in 1970 while only 0.3% of work trips utilized the bus to Dayton). On April 3, 1974, Xenia was struck by a tornado, which destroyed or damaged 39 percent of all homes, 52 percent of all businesses, and left over half the working population unemployed. About 60 percent of the autos and school buses were damaged or destroyed, seriously affecting the mobility of Xenia residents. Thus a large segment of the population, the autoless tornado victims, became transit dependent in a city with no public transportation.

A transit action plan was necessary, at least during the redevelopment period. The kind of service (fixed route, dial-a-ride, etc.) and the usual reasons for implementing transit (rising energy costs, congestion, etc.) were not the issues. Emergency relief was instead the need. The

physical and economic destruction of Xenia led to emergency community relief programs to alleviate basic problems of food supply, shelter acquisition and health care delivery. An integral part of this redevelopment program was the institution of a free-fare transit service funded by the Federal Disaster Assistance Administration (FDAA) at the request of the City of Xenia.

Transit Evolution

Preparation for "instant transit service" was immediate. To ensure the successful implementation of the transit service, Xenia officials secured the support of the professional planning staff of the Montgomery-Greene Transportation Coordinating Committee (TCC) which coordinates with the Miami Valley Regional Planning Commission (MVRPC). TCC professionals proposed a "maximum penetration" transit policy, utilizing a fixed route system. The routes were planned using on-site survey techniques and land-use maps to identify intact and demolished structures.

The free-fare service began on April 6, 1974, just 62 hours after the tornado. Services were provided under contract with Miami Valley Regional Transit Authority (MVRTA). Seven 45-passenger buses were used to provide service on 4 routes averaging 8 miles in length on 25-minute headways from 6:30 a.m. until 6:30 p.m. daily. During the same operational period, a commuter service was initiated from Xenia to the major employment centers in Dayton, Fairborn, and Springfield. However, after a week of poor ridership this commuter service was discontinued. Free service under FDAA sponsorship lasted from April 6, 1974 to July 22, 1974. Total contract cost was $184,182 which included the operational costs of the regular service, maps, schedules, supervisory time and the cost of leased buses (approximately $2,000 per day), and the short-lived commuter service.

In May, 1974, the Transportation Coordinating Committee undertook a study to determine a relevant and operationally reliable service for Xenia. The Xenia system was serving a diversified ridership including school children, young adults, elderly, handicapped, blue collar, and white collar workers. This study emphasized several points; the need to continue the existing temporary service, the need to establish a permanent transit program for Xenia and the need for a regional transportation planning effort. The underlying theme of the study was the use of transit as a tool in reshaping Xenia's redevelopment.

The initial needs were two-fold: the transit program and funding. The TCC began development of a transit program for Xenia, while the city sought to secure funding under the

Service and Methods Demonstration Assistance Program of the Urban Mass Transportation Administration (UMTA). A formal proposal to UMTA was submitted on June 3, 1974, and an informal commitment was secured from UMTA on June 17, 1974, for participation in a demonstration project for Xenia. The UMTA grant was announced on July 21, 1974, as a one-year demonstration and on July 22, 1974, the UMTA demonstration officially began. The initial $300,000 Federal grant was to be supplemented by $18,500 in local funds and services and a $100,000 grant from the county manpower administration's "Project Onward," a public service employment program. This money would be used to aid in paying the salaries of drivers and other personnel employed as part of the project. The demonstration project was due to end on July 21, 1975. However, an 18-month extension was granted and an additional $355,000 in UMTA funds were committed to the program.

The local objectives of the demonstration project were to provide for the implementation and growth of a transit system as part of a complete community redevelopment program, and to demonstrate how a small city transit system can be cost-effective for serving school trips and those trips made by the general population. Moreover, automobile ownership was to be monitored to determine the effect of the transit system on the re-acquisition of autos lost in the disaster.

On July 22, 1974, the first phase of the demonstration began with the formation of the Xenia Department of Transportation and the start of operations on the X-line, the name chosen for the Xenia transit system. During this phase the Miami Valley Transit Authority temporarily continued to operate free service with the seven 45-passenger buses over the 4 routes established under the emergency service. Transit system staff were hired and trained, and negotiations were conducted to obtain a lease on the transit vehicles required for the new service. The monitoring and technical design were carried on by the TCC with support from private consultants. The on-board passenger survey, conducted by the ICC, resulted in a revised route scheme, emphasizing reduced trip time.

On September 1, 1974, the Xenia Department of Transportation began operating the X-line using their own personnel. Ten new buses (seating 19 to 25 passengers) including one fitted with a wheelchair lift (Figure 1) were put into service replacing the fleet carried over from the emergency service. A fare system was also initiated. On November 3, 1974, the X-line implemented the new routes and schedules which were planned in the initial phase.

The emphasis in this new phase of the demonstration was on marketing, promotion, and the testing of various service

Figure 1 Xenia Transit Vehicle with Wheelchair Lifts

Figure 2 Buses at Downtown Interchange Point

refinements so as to maximize the impact of the system. Bus schedules were delivered door-to-door throughout the city of Xenia. A full page advertisement, including a map of the routes, schedules and fares appeared in the local newspaper. In addition, data was collected to identify the socio-economic characteristics of the residents of the area.

By January, 1975, service had evolved into a pattern of operation in which vehicles operated over four routes and met in downtown Xenia at the beginning and end of each tour. The downtown interchange point (Figure 2) was also served by the local taxi operator, the Miami-Valley Bus Line, and shuttle buses to the railroad station and nearby universities. Figure 3 shows the bus route overlay of the Xenia City grid. Three routes were served by two buses and a fourth route by one bus all with 30-minute headways, Monday through Saturday, from 6:00 a.m. to 7:00 p.m. Fixed route service also operated on Sundays and Holidays from 9:00 a.m. to 4:00 p.m. with 60-minute headways. With that route layout, 90% of the population was within a quarter mile of a bus route. Bus stops were located at intervals of approximately 800 feet (6 per mile) with closer intervals in the downtown area. The X-line served all existing major traffic generators in Xenia. These included Greene County Memorial Hospital, all schools, City Hall, Greene County Courthouse, the downtown business district, Kings Plaza Shopping Center, Rogers Medical Clinic, and public housing.

Fares were 25¢ per ride for adults, 10¢ for students through high school age and 10¢ for everyone all day Sunday and holidays. Transfers were free when used within 15 minutes of deboarding. Riders could also purchase monthly passes at a rate of $10.00 for adults and $4.25 for students. In addition, special tokens were distributed by merchants as a promotional scheme. These tokens had a value of 5¢ and could be used in conjunction with cash to pay for rides on the system.

On July 4, 1975, a demand responsive service, operating on Sundays and Holidays, was instituted using the existing vehicles. The fare charged for this service was 10 cents. In November, 1975, Xenia citizens voted on a proposed 0.3 percent increase in local income tax to support the continued operation of the X-line. The issue lost, 2,936 to 1,468.

In December, 1975, the City Commission took a hard look at the X-line system and its deficit. Projections for 1976 indicated a fixed route system operating cost of $480,000. With estimated revenues of only $60,000 and UMTA Section 5 funds of $210,000, Xenia would have to appropriate $210,000 of Town funds to continue the service for another year. The City Commission, deciding that this sum was excessive, voted

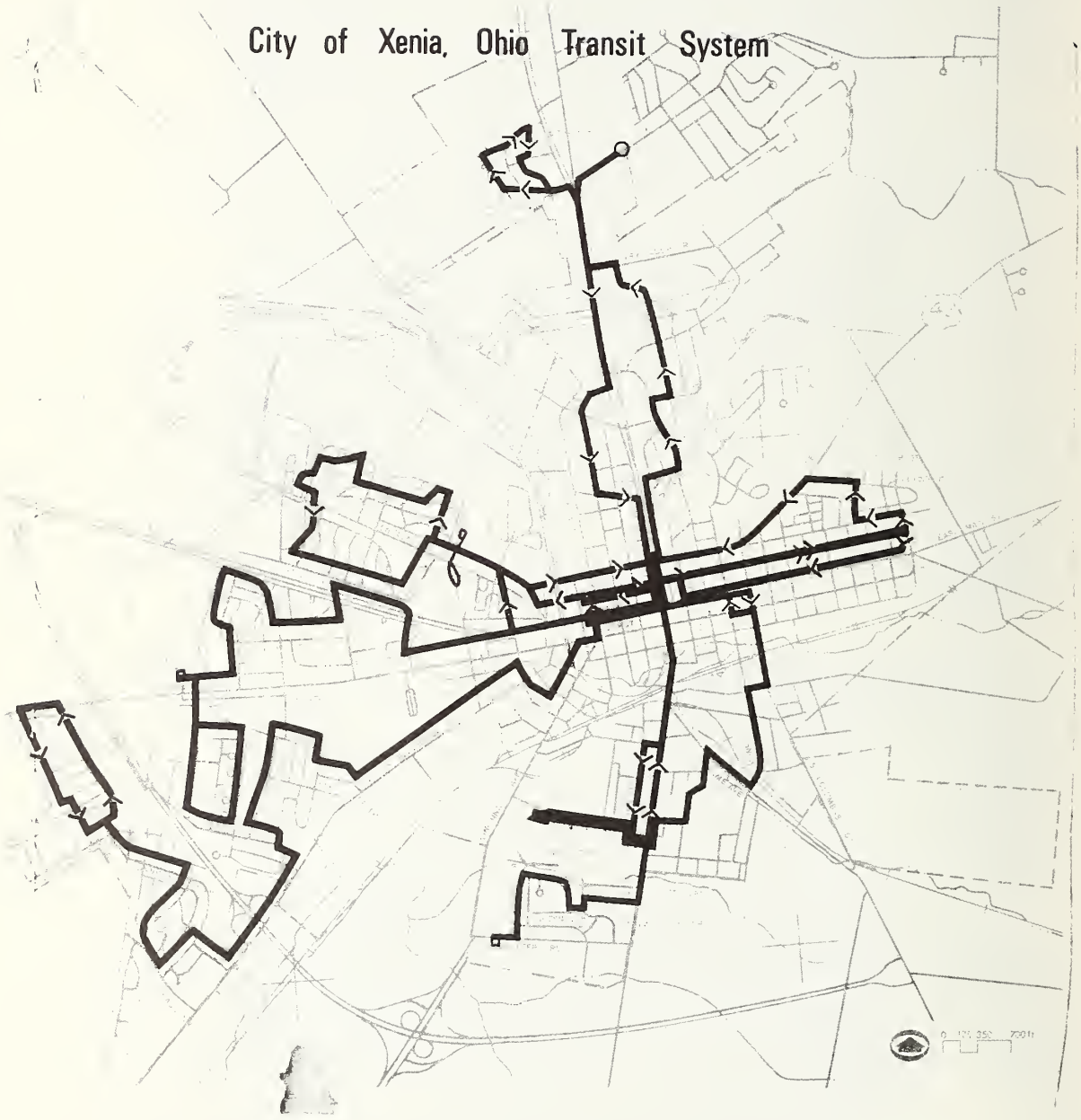

Figure 3. Route Map

to discontinue the X-line service at the end of December. Negotiations then began between the City and UMTA to continue transit service in some form. Agreement was reached to test the operational and economic feasibility of serving the entire City with coordinated para-transit services including jitney, dial-a-ride, shopper shuttle, and subscription components. A comparison of the cost-effectiveness of the para-transit services versus the recently terminated fixed route service was also an objective of the demonstration. No new funding was necessary as the $355,000 previously awarded to Xenia would be sufficient to operate these para-transit services.

On January 1, 1976, para-transit operations began. The seven Flxette vehicles currently travel the previously operated fixed routes but on a non-scheduled basis during the hours of 6:30 a.m. to 10:30 a.m. and 2:30 p.m. to 6:30 p.m., Monday to Saturday. Patrons can either hail a passing vehicle or wait at a bus stop. Dial-a-ride service operates during the midday period. Dial-a-ride is also offered on Sundays from 9:00 a.m. to 3:00 p.m. Fares on all services have been raised to 50 cents for adults and 25 cents for elderly, handicapped, and youth.

The present mode of operation will be continued until sometime in March when it is expected that the City will have finalized contractual arrangements with an outside party to operate the full range of para-transit services. Ultimately, seven new 5 to 8 passenger vehicles will be operating, but initially only four or five will be put into service. The Flxette buses will be phased out when the new taxi-type vehicles begin operation.

Results

System characteristics and operating data are summarized at the end of this report. Transit ridership doubled during the months of X-line operations. However, the average daily ridership was still less than two-thirds of that of the free transit service just before it ceased operations. The ridership trend is shown in Figure 4. It is interesting to note that weekend trip patterns, frequency and productivities have not changed significantly, even though a lower fare dial-a-ride service (operating on Sundays and Holidays) has replaced the fixed route service.

Figure 5 shows the variation in X-line daily tripmaking. While there was a significant peak between 8:00 a.m. and 9:00 a.m., there was no evening peak, but rather a peak in mid-afternoon. The purposes of these trips were distributed as follows:

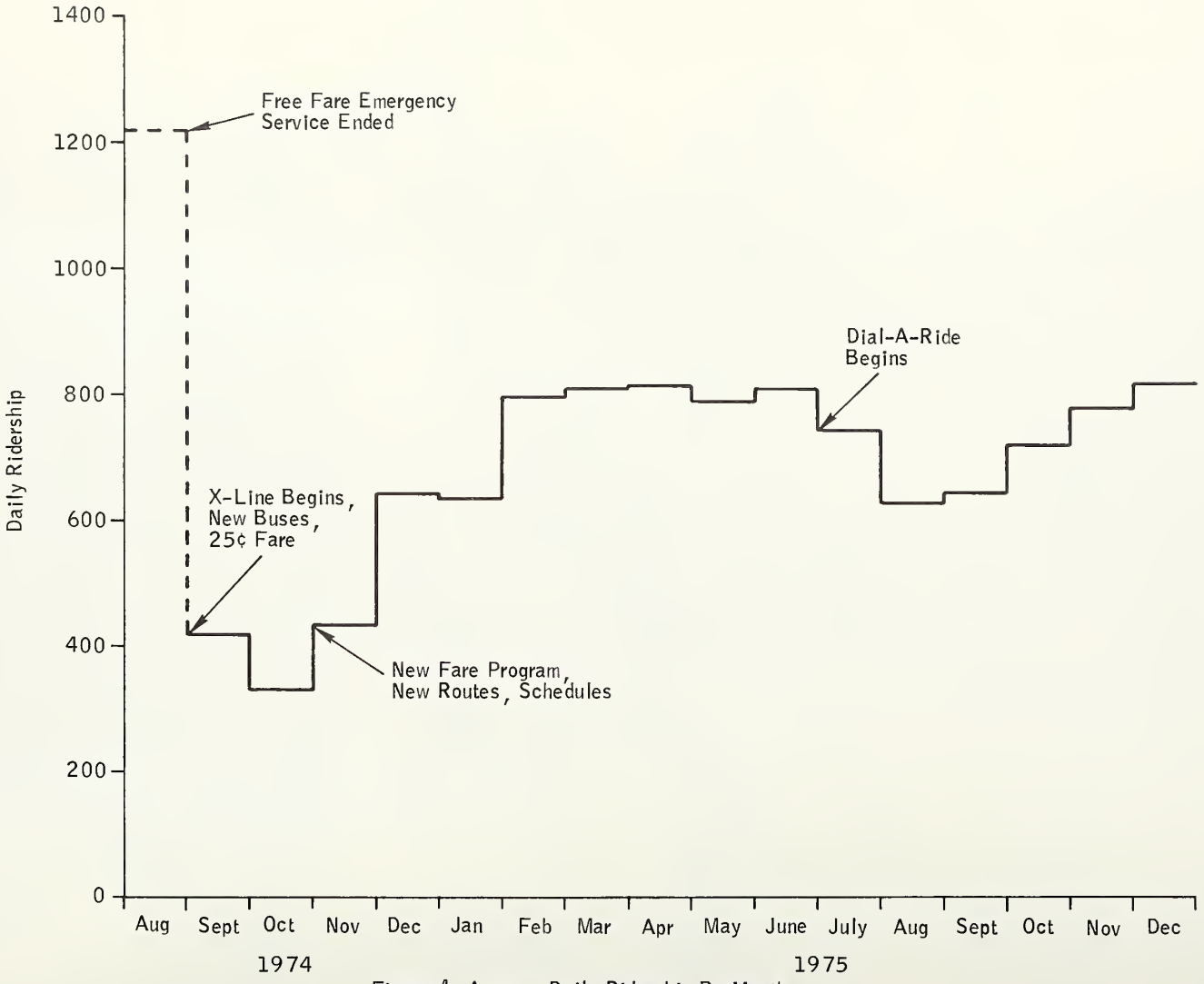

Figure 4. Average Daily Ridership By Month

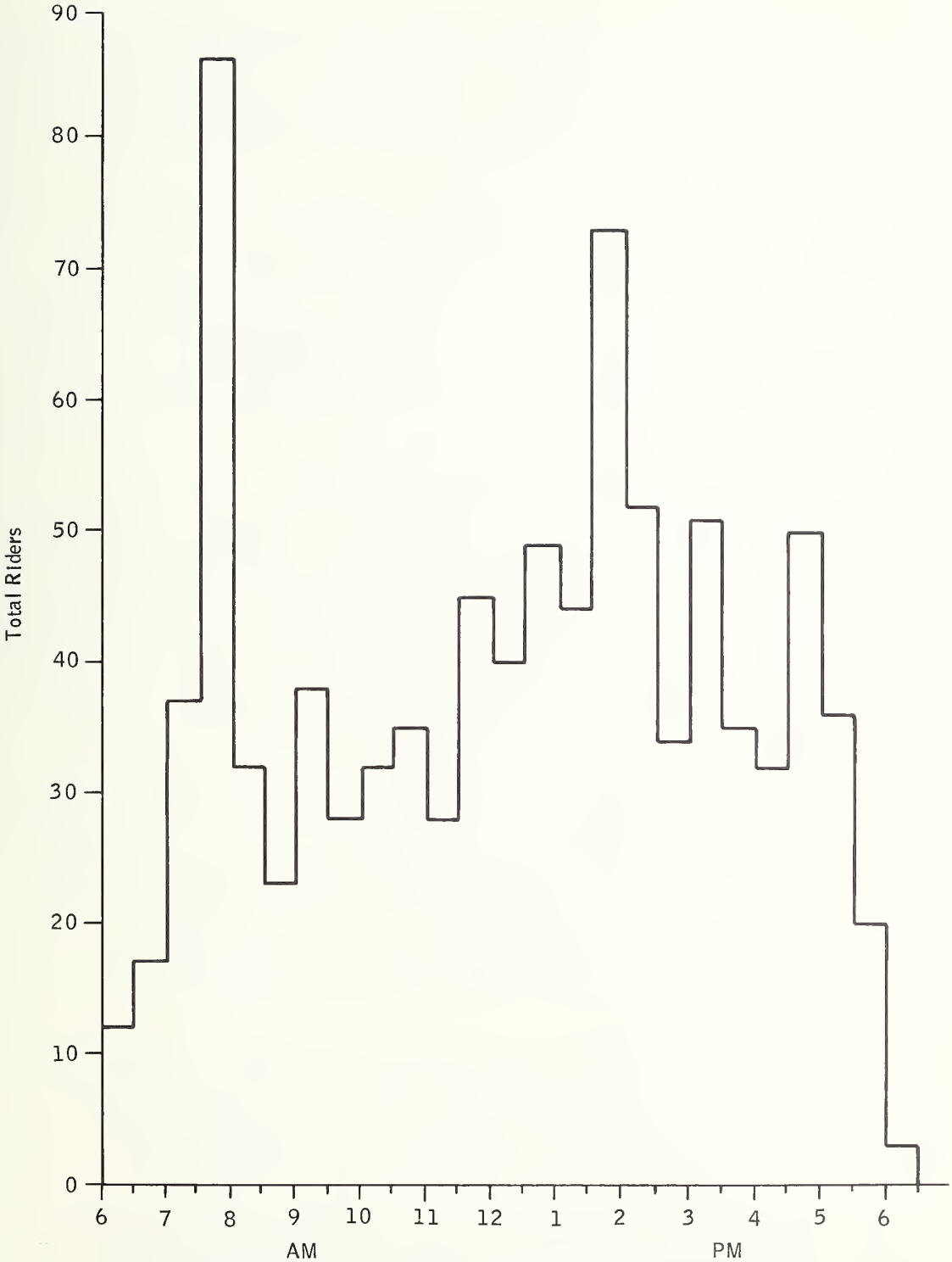

Figure 5. Daily Ridership By Time Of Day (April 3, 1975)

Work	35%
Shopping	33%
Personal	11%
Business	7%
School	11%
Social/Recreation	3%

With 90% of Xenia's population within a quarter-mile of the system, 75% of the patrons walked one block or less from their origin to the bus and 64% walked no more than one block to their destination.

The distribution of income and age of X-line riders shown below corresponded closely to that of the Xenia population, indicating that transit users were drawn from a cross section rather than a socio-economic strata of the population.

Age Distribution of X-line Ridership

Under 12	3%
13-18	28%
19-25	16%
26-64	43%
65+	10%

Household Income Distribution of X-line Ridership

Under 3,000	24%
3,000 - 5,999	16%
6,000 - 9,999	19%
10,000 - 14,999	26%
Over 15,000	15%

Many Xenia residents chose to ride transit rather than return to the degree of reliance on the private auto that existed prior to the tornado disaster. In fact, estimates received from a local lending agency indicate that only 30 percent of all autos that were damaged or destroyed have been restored or replaced.

During the last month of fixed route operation, weekday ridership had exceeded 900 passengers per day. After jitney service was instituted together with higher fares, the weekday ridership dropped below 500 per day. Indications are that considerably fewer students are now using the system.

The reasons for the November, 1975 vote against raising the local income tax to support transit are difficult to pinpoint. One obvious reason is a natural distaste for more taxes. In addition, however, many of the citizens were

apparently naive about transit operations, expecting the buses to run nearly full all the time and be self supporting from the farebox. It is highly unlikely that a transit system functioning as a public service will not require substantial operating subsidies. Nevertheless, X-line's $1.19 subsidy per passenger carried is very high for a fixed-route system.

Conclusions

While it is toc early to tell what affect public transportation will have on the rebuilding of Xenia, it seems evident that it has affected the level of auto ownership in the city. A substantial percentage of the automobiles damaged or destroyed in the tornado were not restored or replaced. It is possible to conclude that this was at least in part due to the availability of a public transit system within easy access of nearly all residents.

A plausible inference that can be drawn from the study of Xenia, is that the establishment of public transportation can result in reduced automobile ownership. However, it should be recognized that a major factor in Xenia's dramatic results was a catastrophic event and other cities could not expect to achieve similar results, at least in such a short period of time. Normally, one would expect a new transit system to achieve a gradual reduction in auto ownership as cars become due for replacement or the escalating cost of operation causes others to be given up.

It seems evident from the broad cross section of transit users and trip purposes served in Xenia, that a transit system offering good coverage and service can effectively serve the travel requirements of a small community. However, in Xenia as well as elsewhere, the cost of public transit may be a major issue in community acceptance.

SUMMARY OF XENIA TRANSIT SYSTEM CHARACTERISTICS

DEMOGRAPHICS

Population in the service area: 27,600
Population density: 3,070 persons per square mile
Median household income: 10,200
Cars owned per household: 0.84
Percent carless households: n/a
Percent transit dependent: 43%
Average distance to service: 85% of population is within 1-1/2 blocks of a bus stop

COVERAGE AND SERVICE

Fixed Route
- Number of routes: 4
- Average route length (one-way): 6.1 miles
- Average route time (one-way): 15 minutes
- Time of service and average headways:
  6:30 am - 6:30 pm 30 Min. Mon - Sat

Demand Responsive Transportation
- Service area: 9 square miles
- Time of service: Sundays and holidays
- Average wait time: 30 scheduled, 7 actual

Number, types and average capacity of vehicles:
- 10 Flxette vehicles (9) - 19 passenger
  (1) - 12 passenger
  4 wheelchair

Number of vehicles in service:

fixed route	7
DRT	4

COST AND PRODUCTIVITY

Operating cost per month: n/a
Vehicle miles per day: 960
Vehicle hours per day: 77.35
Driver hours per day: 87.6
Operating cost per vehicle hour: $11.67
Operating cost per vehicle mile: n/a
Operating cost per passenger: $1.34
Operating cost per passenger trip (one-way): $0.82
Passengers per vehicle hour: 8.7
Passengers per vehicle mile: n/a
Driver wage rate per hour: $3.71

REVENUE AND SUBSIDY:

Fares: fixed route 25¢ adult
10¢ student
50¢ wheelchair

DRT 10¢ in all areas

Revenue per passenger: $0.15
Subsidy per passenger: $1.19
Operating ratio: 8.93
Lease or buy Vehicles: Buy
Funding: $223,000 total capital

RIDERSHIP

Average passengers per weekday: 900
Ridership growth rate: Multiplied by 2 in 2 years and stabilized